

CLAIMS

What is claimed is:

1. A method for coordinating the use of beam forming between two communicating entities wherein control information regarding the use of beam forming is not communicated between the two entities, the method comprising the steps of:

selecting one of the two communicating entities for reduction of the amount in which the selected entity will adjust its beam in response to misalignment between beams emanating from the two entities;

measuring an error in the alignment of the beams emanating from the two communicating entities;

selecting at least one adjustment parameter for adjusting the beam of the selected entity; and

adjusting the beam of the selected entity using the selected adjustment parameter.

2. The method of claim 1 wherein the two communicating entities are a base station and a WTRU.

3. The method of claim 1 wherein the two communicating entities are two WTRUs.

4. The method of claim 1 wherein the at least one adjustment parameter is selected from the group consisting of boresight orientation, beam width, and power gain.

5. The method of claim 1 further comprising the step of:
repeating the measuring and adjusting steps until the error measured is below a predetermined value.

6. A method for coordinating the use of beam forming between two communicating entities wherein control information regarding the use of beam forming is communicated between the two entities, the method comprising the steps of:

measuring an error in the alignment of beams emanating from the two communicating entities;

selecting at least one adjustment parameter for a first of the two communicating entities;

identifying a first correction factor for the first entity;

selecting at least one adjustment parameter for a second of the two communicating entities;

identifying a second correction factor for the second entity; and

adjusting the beam of the two communicating entities in an amount equal to the measured error multiplied by the entities' respective correction factors.

7. The method of claim 6 wherein the two communicating entities are a base station and a WTRU.

8. The method of claim 6 wherein the two communicating entities are two WTRUs.

9. The method of claim 6 wherein the correction factor of one entity is zero thereby causing said entity to refrain from adjusting its beam.

10. The method of claim 6 wherein the at least one adjustment parameter for the first entity is selected from the group consisting of boresight orientation, beam width, and power gain.

11. The method of claim 6 wherein the at least one adjustment parameter for the second entity is selected from the group consisting of boresight orientation, beam width, and power gain.

12. A method for coordinating the use of beam forming between two communicating entities, the method comprising the steps of:

selecting a first correction factor and a first adjustment parameter for each of the entities for use in the azimuth dimension wherein the sum of the two first correction factors is equal to one;

selecting a second correction factor and a second adjustment parameter for each of the entities for use in the elevation dimension wherein the sum of the two second correction factors is equal to one;

measuring an error in the alignment of beams emanating from the two communicating entities in the azimuth dimension;

measuring an error in the alignment of beams emanating from the two communicating entities in the elevation dimension;

adjusting the beam of both entities using the two first adjustment parameters according to both entities' respective first correction factors where an error is detected in the azimuth dimension; and

adjusting the beam of both entities using the two second adjustment parameters according to their respective second correction factors where an error is detected in the elevation dimension.

13. The method of claim 12 wherein the two first adjustment parameters are selected from the group consisting of boresight orientation, beam width, and power gain.

14. The method of claim 13 wherein the two first adjustment parameters are the same for both entities.

15. The method of claim 13 wherein the two first adjustment parameters are different for both entities.

16. The method of claim 12 wherein the two second adjustment parameters are selected from the group consisting of boresight orientation, beam width, and power gain.

17. The method of claim 16 wherein the two second adjustment parameters are the same for both entities.

18. The method of claim 16 wherein the two second adjustment parameters are different for both entities.

19. A method for coordinating the use of beam forming between two communicating entities wherein control information regarding the use of beam forming is communicated between the two entities, the method comprising the steps of:

selecting a correction factor and at least one adjustment parameter for each of the entities;

measuring, at each entity, an error in the alignment of beams emanating from the two communicating entities; and

adjusting the beams using the selected adjustment parameters according to the two entities' respective correction factors and error measurement.

20. The method of claim 19 wherein the at least one adjustment parameter is selected from the group consisting of boresight orientation, beam width, and power gain.

21. The method of claim 19 wherein the at least one adjustment parameter is a plurality of adjustment parameters.

22. The method of claim 21 wherein the plurality of adjustment parameters are selected from the group consisting of boresight orientation, beam width, and power gain.

23. A wireless communication system wherein beams may be adjusted to enhance wireless communications between wireless entities operating in the system, the wireless communication system comprising:

a plurality of wireless entities, said entities being capable of communicating using beam formed transmission and reception patterns and including a processor for measuring an error in the alignment of their own beam and the beam of another entity with which they are communicating; and

wherein at least one of two communicating wireless entities selects at least one adjustment parameter for adjusting its beam a fraction of the error measured in the alignment of its beam with respect to the beam of the other wireless entity.

24. The wireless communication system of claim 23 wherein the processor of the at least one communicating wireless entity is configured to adjust the beam of the at least one wireless entity in an amount equal to the fraction multiplied by the error measured.

25. The wireless communication system of claim 23 wherein the processor of the at least one communicating wireless entity is configured to select at least one adjustment parameter for performing said adjustment.

26. The wireless communication system of claim 25 wherein the at least one adjustment parameter is selected from the group consisting of boresight

orientation, beam width, and power gain.

27. A wireless transmit/receive unit (WTRU) configured to maintain alignment of its beam with the beam of another wireless entity with which the WTRU is communicating, the WTRU comprising:

a first processor configured to measure an error in the alignment of a first beam emanating from the WTRU and a second beam emanating from the other wireless entity;

wherein the first processor is further configured to select at least one adjustment parameter for adjusting the first beam; and

a second processor configured to compute a first fraction and adjust the first beam using the at least one selected parameter in an amount equal to the first fraction multiplied by the error measured.

28. The WTRU of claim 27 further comprising:

a transmitter configured to transmit the fraction of the measured error that the WTRU will adjust its beam to the wireless entity with which the WTRU is communicating.

29. The WTRU of claim 28 further comprising:

a receiver configured to receive, from the wireless entity with which the WTRU is communicating, a second fraction with which the entity used to adjust its beam; and

wherein when a second fraction is received, the second processor being configured to compute the first fraction by subtracting one minus the second fraction and adjusting the first beam in an amount equal to the first fraction multiplied by the error measured.

30. The WTRU of claim 29 wherein the wireless entity with which the WTRU is communicating is another WTRU.

31. The WTRU of claim 29 wherein the wireless entity with which the WTRU is communicating is a base station.

32. The WTRU of claim 27 wherein the at least one adjustment parameter is selected from the group consisting of boresight orientation, beam width, and power gain.

33. A method for coordinating the use of beam forming between two communicating entities, the method comprising the step of:

reducing at least one adjustment parameter of a beam of at least one of two communicating entities communicating with each other using beamed formed transmission and reception signals wherein a degree of alignment between beams emanating from the two entities is above a predetermined level for a predetermined length of time.

34. The method of claim 33 wherein the at least one adjustment parameter that is reduced is beam width.

35. The method of claim 33 wherein the at least one adjustment parameter that is reduced is power gain.

36. The method of claim 33 wherein the at least one adjustment parameter that is reduced is beam width and power gain.